

What is claimed:

1 1. Process for the formation of a silicon layer
2 (22a, 22b, 32, 34) for optical purposes with a determined
3 (optical) thickness, on a support (10), characterized in
4 that it comprises the following steps:

5 a) Molecular bonding of a silicon block (20a, 20b)
6 on the support on which there may or may not already be
7 other layers, the silicon block having a surface layer
8 (22a, 22b, 32, 34) delimited by a cleavage area (21)
9 substantially parallel to its surface, and with a thickness
10 greater than or respectively less than the said determined
11 thickness, and the silicon block being covered by a silicon
12 oxide layer (12a, 12b) brought into contact with the
13 support during bonding,

14 b) cleavage of the silicon block along the cleavage
15 area to detach the surface layer fixed to the support from
16 it,

17 c) thinning or respectively thickening the said
18 surface layer until a thickness substantially equal to the
19 said determined thickness, is obtained.

1 2. Process according to claim 1, in which the
2 thickness of the surface layer (22a, 22b) of the silicon
3 block used in step a) is greater than the determined
4 thickness, and in which thinning of the surface layer in
5 step c) comprises at least one oxidation operation followed
6 by at least one etching operation and/or one polishing
7 operation.

1 3. Process according to claim 1, in which the
2 thickness of the surface layer (22a, 22b) of the silicon
3 block (20a, 20b) used in step a) is less than the
4 determined thickness, and the thickness of the surface
5 layer is increased by crystalline growth during step c).

1 4. Process according to claim 1, in which a hydrogen
2 implantation is performed before step a) through one of the
3 faces (23) of the silicon block to form an embrittled area
4 (21) in the block (20a, 20b), said embrittled area
5 extending substantially along a plan parallel to the
6 surface of said block and forming the cleavage area, the
7 implantation energy being adjusted to form the cleavage
8 area at a depth which is greater than or respectively less
9 than the determined thickness.

1 5. Process for manufacturing a Bragg mirror with
2 wavelength λ on a support, in which a stack of layers is
3 formed comprising alternately at least one layer of silicon
4 oxide (12a, 12b) with optical thickness $\frac{\lambda}{4n_o}$, where n_o
5 denotes the refraction index of the silicon oxide, and at
6 least one silicon layer (22a, 22b) with an optical
7 thickness equal to $\frac{\lambda}{4n_s}$, where n_s is the refraction index of
8 silicon, and in which the said silicon layer is formed
9 according to the process mentioned in claim 1.

1 6. Process according to claim 5, in which the
2 silicon oxide layer is formed by a chemical vapor
3 deposition method or by thermal oxidation of silicon.

1 7. Process for manufacturing an optical component
2 with a working wavelength λ comprising:

- 3 - the formation of a Bragg mirror (30) according to
4 the process described in claim 5,
5 - formation of a layer of active material (34) on the
6 Bragg mirror by crystalline growth, to form a cavity,
7 - formation of a second mirror (36) on the cavity.

1 8. Process according to claim 7, in which the active
2 material is chosen from among pure silicon, silicon
3 containing one impurity, silicon carbide SiC and $\text{Si}_x\text{Ge}_{1-x}$
4 alloys where $0 < x < 1$.

1 9. Process according to claim 7, comprising the
2 formation of said second mirror by deposition of a metallic
3 layer on the cavity.

1 10. Process according to claim 7, including the
2 construction of the second mirror in the form of a Bragg
3 mirror according to claim 5.

1 11. Process for manufacturing an optical component
2 including the formation of a Bragg mirror on a support
3 according to the process in claim 5, followed by the
4 formation of an optical cavity by crystalline growth of at
5 least one active material.

1 12. Process for the manufacture of an optical
2 structure comprising:
3 - formation of a first Bragg mirror (30) on a support,
4 - formation of a silicon layer (32) on the Bragg
5 mirror, according to the process according to claim 1, and
6 - formation of a second mirror (36) above the silicon
7 layer.

1 13. Process according to claim 12, in which the first
2 and second mirrors are Bragg mirrors made according to the
3 process in claim 5.

1 14. Process according to claim 12, in which the
2 optical thickness of the silicon layer (32) is equal to

3 $\frac{\lambda}{4n_s}$, where λ is the working wavelength of the optical

4 structure and n_s is the refraction index of the silicon.

1 15. Process according to claim 12, in which one or
2 several layers (34) of active material chosen among SiGe,
3 SiGeC and SiC are grown on the silicon layer before the
4 formation of the second mirror, to form an optical cavity.